

Application No. 10/064,791  
Docket No. 13DV-13975  
Amendment dated August 4, 2005  
Reply to Office Action of May 5, 2005

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

### **Listing of Claims:**

Claims 1-25 (canceled)

Claim 26 (currently amended): A thermal barrier coating on a surface of a component, the thermal barrier coating comprising a thermal-insulating material whose microstructure comprises columnar grains, the thermal insulating material containing ~~in which is contained~~ clusters of elemental carbon and a carbon-containing gas that is insoluble in the thermal-insulating material, the insoluble gas and at least some of the clusters being entrapped within pores that have been closed by sintering and are within grains and at and between grain boundaries of the thermal-insulating material, the entrapped clusters and the insoluble gas being present substantially throughout the thermal-insulating material in an amount sufficient to thermally stabilize the microstructure of the thermal-insulating material.

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Claim 27 (previously presented): A thermal barrier coating according to claim 26, further comprising clusters of carbides entrapped within some of the pores that were closed by sintering.

Claim 28 (currently amended): A thermal barrier coating according to claim 26, wherein at least some of the pores closed by sintering entrap sulfur dioxide gas and/or nitrogen gas. ~~gas~~

Claim 29 (previously presented): A thermal barrier coating according to claim 26, wherein the insoluble gas is at least one gas chosen from the group consisting of carbon monoxide and carbon dioxide.

Claim 30 (previously presented): A thermal barrier coating according to claim 26, wherein at least some of the pores closed by sintering entrap at least one gas chosen from the group consisting of sulfur dioxide, nitrogen and argon.

Claim 31 (canceled)

Claim 32 (original): A thermal barrier coating according to claim 26,

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wherein the thermal-insulating material is predominantly yttria-stabilized zirconia.

Claim 33 (canceled)

Claim 34 (previously presented): A thermal barrier coating on a surface of a superalloy component, the thermal barrier coating comprising:  
a bond coat on the component; and  
a thermal-insulating material having a columnar microstructure with pores and sub-grain interfaces within, at and between grain boundaries of the microstructure, at least some of the pores throughout the thermal-insulating material being closed by sintering to entrap clusters of elemental carbon and a carbon-containing gas that inhibit further sintering, grain coarsening and pore redistribution within the thermal-insulating material and thereby thermally stabilize the microstructure.

Claim 35 (previously presented): A thermal barrier coating according to claim 34, wherein the thermal-insulating material consists of yttria-stabilized zirconia.

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Claim 36 (previously presented): A thermal barrier coating according to claim 34, wherein at least some of the pores closed by sintering entrap clusters of carbides.

Claim 37 (previously presented): A thermal barrier coating according to claim 36, wherein at least some of the pores closed by sintering entrap carbon dioxide or carbon monoxide.

Claim 38 (previously presented): A thermal barrier coating according to claim 34, wherein at least some of the pores closed by sintering entrap sulfur dioxide gas or nitrogen gas.

Claims 39-40 (canceled)